WO 2005/011283 PCT/US2004/017176

8

CLAIMS

1. A method for encoding a video signal with reduced noise, comprising the steps of: 1 estimating motion for each macroblock in an input video signal N times (where N is an 2 integer) to yield N sets of motion estimation decision sets, each set including a reference 3 picture index and motion vector; 4 creating, for each macroblock, a noise reduced macroblock using the N sets of motion 5 6 estimation data; and encoding each noise reduced macroblock using a best one of the motion estimation 7 8 data sets. The method according to claim 1 wherein the step of estimating motion further 1 2: includes the step estimating the motion N times using each of N different reference pictures. 2 The method according to claim 1 wherein the step of creating the noise reduced 1 3. 2 macroblock further comprises the steps of: selecting at least a plurality of the N sets of motion estimation decision sets; and 3 temporally filtering each pixel in the macroblock to using the selected motion 4 estimation decision sets. 5 The method according to claim 3 wherein the selecting step further comprises 1 4. 2 the steps of: generating a predictor for each motion estimation decision set; 3 calculating a difference between the predictor and the current pixel; 4 determining whether the difference is less than a threshold; and if so 5 selecting the motion estimation decision set whose difference is less than the 6 threshold. 7 The method according to claim 1 further comprising the step of spatially 5. 1

filtering the input video prior to estimating motion.

2

1	6	i	A method for encoding a video signal with reduced noise, comprising the steps	
2	of:			
3	e	estimating motion for each macroblock in an input video signal N times (where N is an		
4	integer) using each of N separate reference pictures to yield N sets of motion estimation			
5	decision sets, each set including a reference picture index and motion vector;			
6	creating, for each macroblock, a noise reduced macroblock using the N sets of motion			
7	estimation data; and			
8	encoding each noise reduced macroblock using the best one of the motion estimation			
9	data			
1		7.	A video encoder, comprising:	
2	a motion estimation stage for estimating the motion in each macroblock of an input			
3	video signal N times (where N is an integer) to yield N sets of motion estimation decision sets,			
4	each set including a reference picture index and motion vector,			
5	a noise reducer for creating a noise reduced macroblock using the N sets of motion			
6	estimation data;			
7	encoding means for encoding the noise reduced macroblock.			
1		8.	The encoder according to claim 7 further including a reference picture store for	
2	storing coded pictures and where the motion estimation stage estimates the motion N times			
3	using each of N different stored reference pictures.			
		•	Til	
. 1		9.	The encoder according to claim 7 further comprising:	
2			ference picture store for storing the coded pictures;	
3	means for applying the stored previously coded pictures as input video stream to for			
4	estimating the motion for each macroblock to yield the N sets of motion estimation decision			
5	sets;			
6	means for applying the motion estimation decision sets to filter pictures for noise			
7	reduc	tion.		

WO 2005/011283 PCT/US2004/017176

10

1 10. The encoder according to claim 7 further comprising a spatial filter for

2 spatially filtering the input video prior to performing motion estimation.